SUSE Linux Enterprise Server Starter System
 for System z

Installation Guide

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Novell, Inc.
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Preparing to Install the SUSE Linux Enterprise Server Starter System for System z

The SUSE Linux Enterprise Server Starter System for System z is a pre-built installation server for SUSE Linux Enterprise Server for System z that can be installed on your z/VM system using CMS tools, eliminating the need for coordinating access to a separate Linux or Unix system elsewhere on your network and minimizing the impact of network-based installation on your internal and external networks.

The starter system includes:

- Utilities and configuration tools for quick installation of the starter system from a CMS terminal session

- Compressed disk images of the starter system, including a complete set of RPM packages as shipped with the SUSE Linux Enterprise Server for System z release.

- Utilities and configuration tools to assist with installation of additional Linux virtual machines from the starter system installation server. The configuration tools package also includes a "rescue" system that can be used to recover a SUSE Linux Enterprise Server for System z virtual machine if there are problems that prevent the server from booting and connecting to the network for normal maintenance.

This document describes the pieces you need to download and the resources needed to install the starter system. The instructions also include an example of how to install an additional Linux server from the starter system.

The Starter System Is Not Suitable for General Use

The starter system image has been highly customized for use as an installation server for other SUSE Linux Enterprise Server for System z based Linux servers running in virtual machines. The starter system is NOT suitable for general use and you should not attempt to use it for any other purpose.

What You Need

To install the starter system, you will need to ensure you have sufficient resources available on your system to complete the installation and obtain two CMS tools and the starter system disk images from the Internet.

Processor Requirements

The SUSE Linux Enterprise Server Starter System for System z and all SUSE Linux Enterprise Server for System z Linux virtual machines require a z/Architecture-capable processor to operate. 31-bit processors such as any model of the 9672 and ESA/390 architecture processors are not supported, and will not function.

Networking Requirements

The starter system requires access to a VSWITCH defined on the z/VM system and one virtual NIC interface attached to that VSWITCH either in the CP directory entry for the virtual machine or via the CP COUPLE command. A guest LAN connection may also be used, however the VSWITCH is more flexible and is considered better practice for the future.

The starter system will require one unique IP address on the network connected to the VSWITCH, along with correct network mask, default gateway, and DNS server parameters for that network. You should obtain this information from your local network administrator and record it on the network planning worksheet in section "Network Connection Information" on page 7.

Disk Requirements

Permanent Disk Requirements

The SUSE Linux Enterprise Server Starter System for System z requires permanent access to two full 3390 model 3 disk packs to hold the system image and the RPM repository. Use the sample directory entry NOVSTART SAMPDIR and your local directory and disk management practices to allocate the disk space as shown in the sample directory entry.

Sites that use larger (model 9 or 27) volumes may combine the minidisks shown in the sample directory entry onto a single larger volume without impact.

Temporary Disk Requirements

During the installation process, the starter system installation will require an additional 3390 model 3 disk pack or an equivalent amount of space for use in storing disk images before installation.

Following installation of the starter system, this temporary space may be released for other uses.

Operating System Requirements

The starter system is designed to work with z/VM release 5.1 and higher. z/VM must be installed before you begin the installation of the starter system. Refer to the IBM reference works listed in Appendix C, "IBM References" on page 40 for additional information on installing and configuring z/VM.

Where to Get the Components

Once you have verified that your system can physically support the starter system requirements,you need to acquire the pieces of the starter system and the disk images. The following sections describe where to obtain each piece.

Obtain All Pieces Before Beginning Installation

Complete the planning worksheet and download all the components before you begin installing the starter system. Having all the parts at the beginning of installation avoids problems or missing data in the installation process.

All of the following files can be obtained from:

```
http://download.novell.com/Download?buildid=M5V5-w8h2M0-
```

Any references in the following sections to file names or locations should refer to this location (e.g., prepend this URL path to the name of the listed file to download that file.

Documentation

The documentation (including this file) can be obtained from the download location noted above. Text and PDF versions of the document are available.

Sample Directory Entry

A sample CP directory entry can be downloaded from the location referred to above. Two versions are available:

- `NOVSTART SAMPDIR`

  The sample directory entry in EBCDIC. This version is suitable for direct submission to directory managers or editing on CMS.

- `NOVSTART SAMPASC`

  The sample directory in ASCII. This version is provided for viewing on ASCII-based hosts. It can be used to preview what will need to be done before uploading the files to the VM system.

CMS Utilities

The CMS utilities required provide the ability to compress and manage disk images. Both utilities shown below are available from the download location noted above.

VMARC The VMARC file archive utility for CMS, which allows decompressing the disk image files before restoring.

CMSDDR A modified version of the CMS DDR command which supports reading and writing disk image data to and from CMS files.

The most current versions of these tools are also included inside the starter system disk images, and may be newer than the ones available from the Novell web site.

Starter System Disk Images

The starter system disk images can be downloaded from the download area noted above. There are 4 files.

```
NOV191    VMARC
NOV150    VMARC
NOV151    VMARC
NOV19F    VMARC
```

Figure 1. Disk Image Files

SUSE Linux Enterprise Server Starter System for System z Planning Worksheet

Use the following worksheets to record important parameters for the starter system install process.

Hardware Prerequisites

Permanent Minidisks

Table 1. Permanent Minidisk Requirements Worksheet						
Virtual Address	**Mini-disk Label**	**Desc**	**Device Type**	**Size**	**Starting Cyl**	**Located on CP VolID**
0191	NOV191	CMS startup and configuration utilities	3390	5 cyl	1	
019F	NOV19F	Starter System installation and recovery tools for new servers	3390	50 cyl	6	
0150	n/a (Unix)	Starter System Boot and User Data	3390	3283 cyl	57	
0151	n/a (Unix)	Starter System RPM Repository	3390	3338 cyl	1	

Temporary Minidisk Work Area

Table 2. Temporary Minidisk Requirements Worksheet						
Virtual Address	**Mini-disk Label**	**Desc**	**Device Type**	**Size**	**Starting Cyl**	**Located on CP VolID**
F000	NOVTMP	Tempo-rary disk for installa-tion work area	3390	3338 cyl	1	

Network Connection Information

Table 3. Network Requirements Worksheet	
Attribute	**Adapter 1**
Virtual Address	0340
VSWITCH Name	
DHCP?	No
IP Address	
Netmask	
Def. Gateway	
DNS Server	

Downloaded Components

All of the following files can be obtained from:

`http://download.novell.com/Download?buildid=M5V5-w8h2M0-`

Any references in the worksheets to file names or locations should refer to this location (e.g., prepend this URL path to the name of the listed file to download that file.

Documentation Downloads

Table 4. Documentation File Checklist	
File Name	**Location**
S10SP1 TXT	s10sp1.txt
S10SP1 PDFBIN	s10sp1.pdf

Sample CP Directory Entry

Table 5. Sample Directory Entry Checklist

File Name	Location
NOVSTART SAMPDIR	novstart.sampdir
NOVSTART SAMPASC	novstart.sampasc

Utility Downloads

Table 6. CMS Utility Download Checklist

File Name	Location
VMAEXEC EXEC	vmaexec.exec
CMSDEXEC EXEC	cmsdexec.exec

Disk Image Downloads

Table 7. Disk Image Download Checklist

File Name	Location
NOV191 VMARC	nov191.vmarc
NOV150 VMARC	nov150.vmarc
NOV151 VMARC	nov151.vmarc
NOV19F VMARC	nov19f.vmarc

Installing the SUSE Linux Enterprise Server Starter System for System z

Installing the SUSE Linux Enterprise Server Starter System for System z

This section describes a step by step installation of the SUSE Linux Enterprise Server Starter System for System z.

Be Sure to Read the Procedure Completely Before Beginning

To make sure you understand the process and steps, read the entire procedure through at least one time from start to finish and ensure that you have completed the planning worksheets and have all the materials ready before beginning to install the starter system.

For illustration purposes, the installation procedure assumes you will use VM userid NOVSTART for the starter system as shown in the sample CP directory entry file. Any userid may be used, however you will need to modify this procedure according to your local conventions.

Preparing the Virtual Machine

1. Create the virtual machine NOVSTART using your local CP directory maintenance procedures. Note that the MDISK entries in the sample directory entry are commented out, and should be used for guidance and disk sizing. The real entries will be added in a later step.

   Elevated CP Privileges Are Not Required

   The starter system virtual machine does not require any privileges beyond the normal class G privileges available to an ordinary z/VM user. You should not grant the starter system virtual machine any additional privileges unless you fully understand the results and risks associated.

   ---

2. Add the minidisks specified in the worksheet using your local directory management procedures. You can use the comments in the sample directory entry or the planning worksheet values to estimate the amount of space needed.

   If using 3390 model 3 volumes, approximately two full volumes will be required. If using 3390 model 9 or 27 volumes, only a fraction of one volume will be required, however there will be a performance impact if all the minidisks are located on the same volume.

   If you are not using an external security manager such as RACF on your z/VM system, ensure that you add minidisk passwords to the minidisks. The 19F minidisk will need public access, and should be assigned a read password of ALL. Example MDISK entries might appear similar to these:

```
MDISK 191 3390 xxxx yyyyyy MR RIAMSL WIAMSL MIAMSL
MDISK 150 3390 xxxx yyyyyy MR RIAMSL WIAMSL MIAMSL
MDISK 151 3390 xxxx yyyyyy MR RIAMSL WIAMSL MIAMSL
MDISK 19F 3390 xxxx yyyyyy MR ALL WIAMSL MIAMSL
MDISK F00 3390 xxxx yyyyyy MR RIAMSL WIAMSL MIAMSL
```

Figure 2. Example MDISK Entries with Passwords

If you are using an external security manager on your z/VM system, consult the documentation for your ESM on how to provide similar function via rules.

It is not necessary to format these minidisks using CMS FORMAT until requested as part of the installation process. The entire contents will be overwritten during the installation of the starter system, including label areas and other data. If you wish to perform CMS FORMAT as a verification before beginning the install, it will do no harm, but will consume significant time due to the size of the repository minidisks.

3. Ensure that users can create VDISKs by updating the settings in the z/VM SYSTEM CONFIG. file to permit creation of VDISKs. Consult the z/VM documentation in Appendix C, "IBM References" on page 40 for more information on updating SYSTEM CONFIG.

Performing the Installation

1. Ensure that the NOVSTART userid is not logged on to z/VM.

2. Log into any other z/VM userid via a tn3270 session.

3. Link the NOVSTART minidisks by typing:

```
LINK NOVSTART 191 F191 MR
LINK NOVSTART 150 F150 MR
LINK NOVSTART 151 F151 MR
LINK NOVSTART 19F F19F MR
LINK NOVSTART F00 F000 MR
```

Figure 3. Linking the NOVSTART Minidisks On Another Userid

4. If your disk management tool does not automatically format minidisks for use with CMS, prepare the F000 minidisk for use.

Some CMS disk and directory management tools do not automatically prepare minidisks for use with CMS. To do this, you need to use the CMS FORMAT command to prepare the disk for use. If your disk management tool automatically formats your minidisks before making them available, skip this step.

An example FORMAT command and execution should look similar to the following:

```
   You:      FORMAT F000 G
System:      DMSFOR0603R FORMAT will erase all files on disk G(F000).
                         Do you wish to continue? Enter 1 (YES) or 0 (NO).
   You:      1
System:      DMSFOR605R  Enter disk label:
   You:      NOVF00
System:      DMSFOR733I Formatting disk G
             Ready; T=0.02/0.18 15:50:35
```

Figure 4. Formatting NOVSTART F00 For Use

5. Release the F000 minidisk to allow the FTP server to access it.

   Once the minidisk is formatted, you need to release read/write access to it to allow the FTP server to write on it. To do this, type:

   ```
   RELEASE G ( DETACH
   ```

6. Transfer the CMS tools and disk images for 191 and 19F to work disk.

   The images and CMS tools must be transferred via FTP in BINARY mode to ensure that the files are not modified in transit. Use the planning and installation worksheet as a checklist for the process of uploading the files to z/VM.

   The files can also be transferred using magnetic tape if a tape drive is available.

   Use BINARY Mode When Transferring with FTP

   If you use FTP to transfer the files, the files must be transferred using BINARY mode. Using the default ASCII transfer will corrupt the files and make them unusable.

   If transferring the files via tape, be certain to preserve file attributes such as LRECL, record format and block size. The CMS utilities expect the files to be in certain formats, and will fail if not presented with the correct input.

   A FTP session might appear similar to the following example:

```
System:   c:\>
  You:    FTP ZVM.EXAMPLE.COM
System:   Connected to zvm.example.com
          220-FTPSERVE IBM VM Level 520 at zvm.example.com ...
          220 Connection will close if idle for more than 5 minutes.
          Name (zvm.example.com:novstart):
  You:    NOVSTART
System:   331 Send password please.
          Password:
  You:    (password for NOVSTART)
System:   230 NOVSTART logged in; working directory = NOVSTART 191
          Remote system type is VM
          ftp>
  You:    cd NOVSTART.F00
System:   250 Working directory is NOVSTART F00
          ftp>
  You:    binary
System:   200 Representation type is IMAGE.
          ftp>
  You:    site fix 80
System:   200 Site command was accepted.
          ftp>
  You:    put vmaexec.exec vmaexec.exec
System:   ...transfer messages...

          ftp>
  You:    put cmsdexec.exec cmsdexec.exec
System:   ... transfer messages ...

          ftp>
  You:    put nov191.vmarc nov191.vmarc
System:   ... transfer messages ...

          ftp>
  You:    put nov19f.vmarc nov19f.vmarc
System:   ... transfer messages ...

          ftp>
  You:    quit
System:   221 Quit command received. Goodbye.
          c:\>
```

Figure 5. Sample FTP Session from a Workstation to z/VM

7. Relink the NOVSTART F00 minidisk following the data transfer by issuing the LINK
   NOVSTART F00 F000 MR command.

8. Access the NOVSTART temporary disk as filemode A by typing ACCESS F000 A

9. Access the VM TCPIP utilities by typing VMLINK TCPMAINT 592

10. Unpack the VMARC MODULE file.

    To unpack VMARC, type:

```
EXEC VMAEXEC EXTRACT A
```

Figure 6. Unpacking VMARC MODULE

11. Unpack CMSDDR

   To unpack CMSDDR, execute the following:

```
EXEC CMSDEXEC EXTRACT A
```

Figure 7. Unpacking CMSDDR

12. Unpack NOV191 VMARC.

   To unpack NOV191 VMARC, type:

```
VMARC UNPACK NOV191 VMARC A * * A
```

Figure 8. Unpacking NOV191 VMARC

   The resulting file NOV191 DISKIMG is the contents of the NOVSTART 191 disk.

13. Restore NOV191 DISKIMG to NOVSTART 191.

   To restore the NOV191 DISKIMG file to NOVSTART 191, type:

```
CMSDDR RESTORE F191 NOV191 DISKIMG A
```

Figure 9. Restoring NOV191 DISKIMG to NOVSTART 191

14. Erase NOV191 DISKIMG and NOV191 VMARC.

```
ERASE NOV191 DISKIMG A
ERASE NOV191 VMARC   A
```

Figure 10. Erasing NOV191 Image and Distribution Archives

15. Unpack NOV19F VMARC.

   To unpack NOV19F VMARC, type:

```
VMARC UNPACK NOV19F VMARC A * * A
```

Figure 11. Unpacking NOV19F VMARC

   The resulting file NOV19F DISKIMG is the contents of the NOVSTART 19F disk.

16. Restore NOV19F DISKIMG to NOVSTART 19F.

   To restore the NOV19F DISKIMG file to NOVSTART 19F, type:

```
CMSDDR RESTORE F19F NOV19F DISKIMG A
```

Figure 12. Restoring NOV19F DISKIMG to NOVSTART 19F

17. Erase NOV19F DISKIMG and NOV19F VMARC.

```
ERASE NOV19F DISKIMG A
ERASE NOV19F VMARC   A
```

Figure 13. Erasing NOV19F Image and Distribution Archives

18. Erase VMAEXEC EXEC and CMSDEXEC EXEC.

```
ERASE VMAEXEC  EXEC  A
ERASE CMSDEXEC EXEC  A
```

Figure 14. Erasing Tools Distribution Archives

19. Format NOVSTART 150.

    To format NOVSTART 150, type:

```
  You:      FORMAT F150 G.
System:     DMSFOR0603R FORMAT will erase all files on disk G(F150).
                        Do you wish to continue? Enter 1 (YES) or 0 (NO).
  You:      1
System:     DMSFOR605R  Enter disk label:
  You:      NOV150
System:     DMSFOR733I Formatting disk G
            Ready; T=0.02/0.18 15:50:35
```

Figure 15. Formatting NOVSTART 150

20. Release read/write access to NOVSTART 150

```
RELEASE G ( DETACH
```

Figure 16. Release R/W Access to NOVSTART 150

21. Transfer NOV151 VMARC to NOVSTART 150

```
System:     c:\>
   You:     FTP ZVM.EXAMPLE.COM
System:     Connected to zvm.example.com
            220-FTPSERVE IBM VM Level 520 at zvm.example.com ...
            220 Connection will close if idle for more than 5 minutes.
            Name (zvm.example.com:novstart):
   You:     NOVSTART
System:     331 Send password please.
            Password:
   You:     (password for NOVSTART)
System:     230 NOVSTART logged in; working directory = NOVSTART 191
            Remote system type is VM
            ftp>
   You:     cd NOVSTART.150
System:     250 Working directory is NOVSTART 150
            ftp>
   You:     binary
System:     200 Representation type is IMAGE.
            ftp>
   You:     site fix 80
System:     200 Site command was accepted.
            ftp>
   You:     put nov151.vmarc nov151.vmarc
System:


            ... transfer messages ...


            ftp>
   You:     quit
System:     221 Quit command received. Goodbye.
            c:\>
```

Figure 17. Sample FTP Session from a Workstation to z/VM (NOVSTART 151)

22. Relink NOVSTART 150 to your VM userid.

```
LINK NOVSTART 150 F150 MR
```

Figure 18. Re-linking NOVSTART 150 On Another Userid

23. Access F150, F191 and F19F

```
ACCESS F191 E
ACCESS F19F F
ACCESS F150 G
```

Figure 19. Access NOVSTART Minidisks

24. Unpack NOV151 VMARC

   To unpack NOV151 VMARC, type:

```
VMARC UNPACK NOV151 VMARC G * * A
```

Figure 20. Unpacking NOV151 VMARC

The resulting file NOV151 DISKIMG is the contents of the NOVSTART 151 disk.

25. Restore NOV151 DISKIMG to NOVSTART 151.

To restore the NOV151 DISKIMG file to NOVSTART 151, type:

```
CMSDDR RESTORE F151 NOV151 DISKIMG A
```

Figure 21. Restoring NOV151 DISKIMG to NOVSTART 151

26. Erase NOV151 DISKIMG and NOV151 VMARC.

```
ERASE NOV151 DISKIMG A
ERASE NOV151 VMARC   G
```

Figure 22. Erasing NOV151 Image and Distribution Archives

27. Release read/write access to NOVSTART F00

```
RELEASE A ( DETACH
```

Figure 23. Release R/W Access to NOVSTART F00

28. Transfer NOV150 VMARC to NOVSTART F00

```
System:      c:\>
   You:      FTP ZVM.EXAMPLE.COM
System:      Connected to zvm.example.com
             220-FTPSERVE IBM VM Level 520 at zvm.example.com ...
             220 Connection will close if idle for more than 5 minutes.
             Name (zvm.example.com:novstart):
   You:      NOVSTART
System:      331 Send password please.
             Password:
   You:      (password for NOVSTART)
System:      230 NOVSTART logged in; working directory = NOVSTART 191
             Remote system type is VM
             ftp>
   You:      cd NOVSTART.F00
System:      250 Working directory is NOVSTART F00
             ftp>
   You:      binary
System:      200 Representation type is IMAGE.
             ftp>
   You:      site fix 80
System:      200 Site command was accepted.
             ftp>
   You:      put nov150.vmarc nov150.vmarc
System:


             ... transfer messages ...


             ftp>
   You:      quit
System:      221 Quit command received. Goodbye.
             c:\>
```

Figure 24. Sample FTP Session from a Workstation to z/VM (NOVSTART 150)

29. Relink NOVSTART F00 to your VM userid.

```
LINK NOVSTART F00 F000 MR
```

Figure 25. Re-linking NOVSTART 150 On Another Userid

30. Access the F000 minidisk

```
ACCESS F000 J
ACCESS 191  A
```

Figure 26. Access NOVSTART Minidisks

31. Unpack NOV150 VMARC

    To unpack NOV150 VMARC, type:

```
VMARC UNPACK NOV150 VMARC J * * J
```

Figure 27. Unpacking NOV150 VMARC

The resulting file NOV150 DISKIMG is the contents of the NOVSTART 150 disk.

32. Restore NOV150 DISKIMG to NOVSTART 150.

    To restore the NOV150 DISKIMG file to NOVSTART 150, type:

```
CMSDDR RESTORE F150 NOV150 DISKIMG J
```

Figure 28. Restoring NOV150 DISKIMG to NOVSTART 150

33. Erase NOV150 DISKIMG and NOV150 VMARC.

```
ERASE NOV150 DISKIMG J
ERASE NOV150 VMARC   J
```

Figure 29. Erasing NOV151 Image and Distribution Archives

34. Release and detach the temporary work disk by typing:

    RELEASE J (DETACH

    NOVSTART F00 may now be deallocated and returned to the system for reuse.

You have completed the installation of the starter system code. Remain logged into the second VM userid and refer to section "Configuring the SUSE Linux Enterprise Server Starter System for System z" on page 22 for information on how to configure the starter system.

Configuring the SUSE Linux Enterprise Server Starter System for System z

Configuring the SUSE Linux Enterprise Server Starter System for System z

The starter system is almost completely configured, however some information about your local network needs to be supplied in order to properly connect and be usable.

If you are continuing immediately after installing the code, skip to "Configuring Network Connectivity to the Starter System" If you need to set up the environment following an interruption, follow these steps:

1. Ensure that the NOVSTART userid is not logged on to z/VM.

2. Log into any other z/VM userid via a tn3270 session.

3. Link the NOVSTART minidisks by typing:

```
LINK NOVSTART 191 F191 MR
LINK NOVSTART 150 F150 MR
LINK NOVSTART 151 F151 MR
LINK NOVSTART 19F F19F MR
```

Figure 30. Linking the NOVSTART Minidisks On Another Userid

Configuring Network Connectivity to the Starter System

The starter system uses a simplified form of network configuration based on a CMS file. The starter system reads this file when the system is initialized and uses it to COUPLE the network adapter to the correct VSWITCH or guest LAN and provide network parameters to the Linux IP stack.

To configure network connectivity for the starter system virtual machine, perform these steps:

1. Access NOVSTART 191 as filemode A by typing: `ACCESS F191 A`

2. Edit NETWORK PARMS A using XEDIT by typing: `XEDIT NETWORK PARMS A`. The file should appear similar to Figure 31 on page 23.

    > **The Sample XEDIT Profile on NOVSTART Uses Different Defaults**
    >
    > Note that the PROFILE XEDIT file on NOVSTART 191 (accessed as F191 in the above step) changes the default appearance of XEDIT. Moving the XEDIT prefix area to the right side allows easier updating of the important parts of the file without having to skip over the prefix area when moving the cursor.

```
# NETWORK PARMS
#
# Network parameter file for the NOVSTART installation server
# Lines beginning with "#" are comments; other lines are
# key=value pairs
#
# If you have a layer 2 VSWITCH and a functioning DHCP server,
# you can remove the # from column 1 of the following lines and
# have a working configuration.
#
#LAYER2=Y
#DHCP=Y
#
# Otherwise: IPADDR, NETWORK, NETMASK and BROADCAST are your basic
# IP address parameters. Check with your local network administrator
# to determine what these values should contain.
#
# IPADDR is the IP address of the starter system.
#
# NETMASK is the network mask used on this network.
#
# GATEWAY is the IP address of the router between your local network
# and the rest of the world
#
# NAMESERVER is the IP address of your nameserver (if any)
#
# FQDN is your install server's fully-qualified host name
#
# LAYER2 indicates whether the VSWITCH is in layer 2 or layer 3 mode.
# If you are using a guest LAN, LAYER2 should always be N.
#
# DHCP indicates whether the guest should attempt to use DHCP to
# obtain network information. Requires LAYER2=Y and a layer 2
# VSWITCH to work.
#
IPADDR=10.0.0.2
NETMASK=255.255.255.0
GATEWAY=10.0.0.1
NAMESERVER=10.0.0.23
FQDN=novstart.example.com
LAYER2=N
DHCP=N
```

Figure 31. Sample NETWORK PARMS File

3. Modify the IPADDR, NETMASK, GATEWAY, NAMESERVER, FQDN, LAYER2, and DHCP entries by moving the cursor to the text and typing over the values.

4. Press Enter to move the cursor to the XEDIT command line.

5. Type FILE to save your changes and exit XEDIT.

6. Next, you need to update the PROFILE EXEC stored on NOVSTART 191 by editing the file.

7. Open the PROFILE EXEC file by typing XEDIT PROFILE EXEC A. Near the top of the file, you will see lines similar to the following:

```
/* PROFILE EXEC for NOVSTART SLES Installation server */
'CP SET PF12 RETRIEVE'
'CP SPOOL CON TO MAINT'
'CP SPOOL CON START'
'ACCESS 19F D'
'SWAPGEN 160 200000'

/* Update the following variables to reflect the owner of the      */
/* guest LAN or VSWITCH you are using, and the name of the LAN      */
/* or switch.                                                       */

owner = 'SYSTEM'
lan_name = 'GLAN1'
    ⋮
```

Figure 32. Updating PROFILE EXEC on NOVSTART 191

8. Modify the values by moving the cursor to the text and typing over the values for owner and lan_name. Ensure the values are enclosed in single quotes (').

9. Press Enter to move the cursor to the XEDIT command line.

10. Type FILE to save your changes and exit XEDIT.

11. Detach all NOVSTART minidisks and log off the z/VM userid.

```
DETACH F191
DETACH F150
DETACH F151
DETACH F19F
```

Figure 33. Detaching All NOVSTART Minidisks

Configuration is now complete.

Starting NOVSTART for the First Time

From OPERATOR or another privileged userid, type AUTOLOG NOVSTART. After a minute or so, you should be able to ping the IP address of your server from another workstation or the z/VM TCPIP stack.

```
ping novstart.example.com

Ping Level 520: Pinging host NOVSTART.EXAMPLE.COM (10.0.0.2). Enter
   #CP EXT to interrupt.
PING: Ping #1 response took 0.001 seconds. Successes so far 1.
PING: Ping #2 response took 0.001 seconds. Successes so far 2.
```

Figure 34. Pinging the NOVSTART Starter System From z/VM

You can also log in directly to the VM system as NOVSTART and watch the startup process on the virtual machine console directly. If you do this, you will notice the virtual machine boot Linux, reconfigure the network, and then reboot automatically. *This is*

normal. The system will respond to `ping` after about a minute or so (perhaps less if you have a very fast processor).

Other NOVSTART Maintenance Tasks

Changing NOVSTART Root Password

The starter system is shipped with a default root password of "rootpass" and should be changed immediately after installation. To change this password:

1. Log in to the starter system as root from a SSH client such as PuTTY or another Linux system using the `ssh` command.

2. Use the `passwd` command to change the password to your desired value.

Disabling the Postfix MTA

Some components of the starter system need a mail transport agent to deliver notifications to the administrative user about package installation and other configuration changes. As delivered, the starter system will accept mail from other systems to the administrative user of the starter system only. To disable receipt of any mail from outside the starter system, you can disable the Postfix daemon using the following commands while logged in as `root` on the starter system.

To disable the Postfix installation, type:

```
cd /etc/postfix
cp main.cf main.cf.save
sed '667d' main.cf > main.cf.new
cp main.cf.new main.cf
service postfix restart
cd
```

Figure 35. Disabling the Postfix MTA

Disabling Automatic Filesystem Checking for the Repository

Linux is normally configured to check all read-write filesystems periodically for consistency. Some organizations disable this check for servers that rarely change to save time on startup.

If you would like to disable filesystem checking for the RPM repository filesystem (which is the largest part of the starter system package), you can use the following commands to do so.

To disable automatic filesystem checking for the repository, type:

```
tunefs -i0 -c0 /dev/system/repository
```

Figure 36. Disabling Automatic Checking for Repository Filesystems

Note that automatic file system checks will still occur if the starter system kernel detects a problem with the filesystem.

Recovering from a Damaged or Misconfigured Network Configuration

If you need to change the network configuration of the starter system, use the following process:

1. Log into the starter system as root and type:

```
touch /unconfigured
```

Figure 37. Resetting Network Configuration for the Starter System

2. Shut down the starter system by typing `shutdown -r now`.

3. Log in to the NOVSTART id.

4. Update NETWORK PARMS to reflect the new network information. Refer to "Configuring Network Connectivity to the Starter System" on page 22 for steps to use to update NETWORK PARMS.

5. Log off the NOVSTART id.

6. Restart NOVSTART by typing `XAUTOLOG NOVSTART` from a privileged userid such as MAINT or OPERATOR.

The starter system will update its network parameters as part of the restart.

If the NETWORK PARMS file does not exist or is unreadable for some reason, the IPL process for NOVSTART will pause and allow entry of network parameters at the virtual machine console.

Note that while YaST is available on this system, it is not functional in full-screen or text mode until the network is configured. If you have a functional network, you can connect to the starter system via ssh and update network addresses using YaST in the normal manner.

As supplied, the system has no general user accounts defined. General users should be provisioned on virtual machine servers built from the starter system, and thus defining general users on the starter system is not recommended.

Installing a New Linux Guest from the Starter System

Installing a New Guest from the Starter System

Now that you have the starter system installed, you can use it to install additional virtual Linux servers quickly and easily without need for an external installation media server.

The directions in this section describe how to install additional servers using the starter system as a source.

CP Directory Entry Notes

When creating a new virtual server, the CLIENT SAMPDIR file on NOVSTART 19F can be used as a template CP directory entry. CLIENT SAMPDIR defines a basic set of virtual machine options and devices and can be used as a basic convention for installing all your virtual servers.

The CLIENT SAMPDIR file supplied with the starter system is shown in Figure 38 on page 29.

```
USER CLIENT password 512M 512M G
*
*  Sample Linux virtual server CP directory entry.
*
*  Following statements define the virtual machine console,
*  processors, machine mode and spooled unit record devices
*  simulated by z/VM.
*
   CONSOLE 0009 3215 T CONLOG
   SPOOL 000C 2540 READER *
   SPOOL 000D 2540 PUNCH A
   SPOOL 000E 1403 A
   CPU 0
   CPU 1
   IPL CMS PARM AUTOCR
   MACHINE XA 2
*
*  These statements link important components for use by
*  CMS during IPL
*
   LINK MAINT 0190 0190 RR
   LINK MAINT 019E 019E RR
   LINK MAINT 019D 019D RR
*
*  This statement links the starter system setup tools for
*  use during Linux installation
*
   LINK NOVSTART 019F 019F RR
*
*  This statement defines a virtual network adapter for the
*  virtual machine. This example shows defining the connection to
*  a guest LAN in the CP directory entry if you so desire.
*
   NICDEF 0340 TYPE QDIO LAN SYSTEM GLAN1
*
*  These statements show examples of minidisk definitions for the
*  new virtual machine. The last token on each line is the CP label
*  of the DASD that will contain the minidisk. These should be
*  allocated using your local CP directory management process.
*
*  MDISK 0191 3390 0001 0005 USER03
*  MDISK 0150 3390 0006 0050 USER03
*  MDISK 0151 3390 0056 3283 USER03
*  MDISK 0152 3390 0001 3338 USER04
```

Figure 38. Sample CLIENT SAMPDIR

The CLIENT SAMPDIR file defines the following options:

- 2 virtual CPUs

- 512M virtual storage

- One virtual NIC at address 340. You will need to update the NICDEF to reflect the guest LAN or VSWITCH to which you wish to connect the network adapter. For initial installation, it should be the same VSWITCH or guest LAN to which you attached the starter system.

- A link to NOVSTART 19F (installation and helpful operations tools)

- A link to MAINT 190 (for use by CMS)

- Comments on recommended minidisk sizes and virtual address patterns.

    - 0191 (for CMS startup and configuration use)

    - 0150-015F (Linux disks)

    - 0160-016F (Swap space, created via DEFINE VDISK or SWAPGEN)

    - 0170-017F (Additional Linux disks if needed)

Actual minidisks should be added using your local directory maintenance procedures.

NOVSTART 19F also contains some helpful tools for starting the installation process:

SLES Run this EXEC to send the standard installation kernel text decks to the virtual reader of the new guest and IPL from the virtual reader. This EXEC should be run from the new virtual machine you are installing.

The SLES exec can also be used to start a damaged system to effect repairs.

SWAPGEN SWAPGEN provides a simple method of formatting and utilizing virtual disk in memory (VDISK) for Linux swap space.

These tools should be available to all Linux guests installed from the starter system.

Starting the Install Process

To start the install, follow these steps:

1. Create a new z/VM userid based on CLIENT SAMPDIR (as described above).

2. Log in as the new z/VM userid via tn3270.

3. Format the minidisk at virtual address 0191 by typing:

   `FORMAT 191 A`

   The label of the minidisk is not important.

4. Access NOVSTART 19F by typing `ACCESS 19F Q`

5. Copy the sample PROFILE EXEC from NOVSTART 19F by typing: `COPYFILE PROFILE SAMPEXEC Q PROFILE EXEC A`

6. Start the installation process by typing `SLES`

   The install process will begin.

The remainder of the installation process will proceed as described in the Novell documentation. You should respond to the prompts similar to the following:

- Select `4) Start Installation of System`

- Select `1) Start Installation or Update`

- Select `2) Network`

- Select your desired installation method (see "Specifying the Install Server Address and Install Method" on page 31)

- Select `1) OSA-2 or OSA Express` as the network device.

- Select 1) `QDIO`

- Select 1) `Ethernet`

- When prompted, enter the OSA address information. For servers based on CLIENT SAMPDIR, these values should be:

Table 8. Channel Device Identifiers for Client Network-based Install	
Channel ID	**Value**
Read	0.0.0340
Write	0.0.0341
Data	0.0.0342

A port name is not necessary for virtual NICs.Enabling layer 2 support should reflect the definition of the guest LAN or VSWITCH to which the new server is connected.

- Specify the network address of the starter system server as the installation source. See "Specifying the Install Server Address and Install Method" for other information specific to your installation method.

Specifying the Install Server Address and Install Method

The starter system provides NFS, FTP, SMB and HTTP-based installation support. When prompted for the address of the installation source, supply the IP address of the starter system virtual machine.

You may choose any of the supported installation methods; all work equally well over the internal network provided by a guest LAN or VSWITCH.

Each installation method will require some additional information about how to locate the data used by that method. The following table describes additional parameters used by that method.

Table 9. Install Methods And Parameters	
Method	**Parameters**
FTP	User `anonymous`, directory is `/`
HTTP	Directory is `/`
NFS	Directory is `/srv/repository`
SMB	Workgroup REPOSITORY, share "repository", user `guest` Directory is `/`.

No proxy server or application gateway specifications are required if using the starter system as the installation source.

Additional Information About the Install Process

Following the completion of the install process, you will likely be able to reduce the amount of virtual storage required by the newly-installed virtual machine, although how much reduction is possible will be dictated by the applications and features you have installed. Smaller virtual machines typically help overall system performance by imposing a smaller memory footprint for z/VM to manage.

You can add additional software to your installed virtual machine using YaST and the starter system as a installation source.

If You Have Problems

Common Problems and Solutions

While we have tried to eliminate problems before they can cause you difficulty, you may encounter a problem or error message during your use of the starter system. This section describes some common error messages and how to resolve them. If your problem is not listed here, use the process described in "How to Report Problems With the Starter System" on page 36 to report the problem to Novell.

DDR reports CMS as a invalid operand.

This error is caused by attempting to use the original IBM version of DDR instead of the version supplied in the CMSDDR package.

The solution to this problem is to ensure that the minidisk containing the CMSDDR package (usually NOVSTART 19F) is accessed at a filemode prior to S (the location of the default IBM DDR module).

The COUPLE command reports an error in the PROFILE EXEC on IPL

This error is normally caused by specifying a VSWITCH or guest LAN in PROFILE EXEC or in the CP directory entry that does not exist or to which you do not have permission to connect.

To solve this problem:

1. Verify that you have spelled the VSWITCH or guest LAN name correctly in NETWORK PARMS on NOVSTART 191.

2. Grant the guest permission to COUPLE to the guest LAN or VSWITCH using the SET LAN or SET VSWITCH commands. An example of the SET LAN command might appear similar to:

```
SET LAN USERLAN GRANT NOVSTART
```

Figure 39. Example of SET LAN for the NOVSTART User

An example fo the SET VSWITCH command might appear similar to:

```
SET VSWITCH USERSW GRANT NOVSTART
```

Figure 40. Example of SET VSWITCH for the NOVSTART User

> **SET LAN And SET VSWITCH Are Temporary**
>
> The effects of SET LAN and SET VSWITCH are not permanent across IPL of the z/VM hipervisor. To make these changes permanent, you need to update SYSTEM CONFIG. Consult the z/VM documentation on how to make this change.

The temporary disk is too small to hold the starter system files.

This problem is caused by skipping the steps that erase the VMARC and DISKIMG files following each restore step.

To solve this problem, backtrack your steps in the install process and verify that you have erased the temporary files that you have already restored to the minidisks owned by NOVSTART.

If you have not skipped a step, report a problem as described in "How to Report Problems With the Starter System" on page 36

The FTP session is prompting for a write password.

This problem is usually indicated by receiving messages similar to the following:

```
ftp> cd novstart.F00
250-Working directory is NOVSTART F00 (ReadOnly)
250 for write access, send 'ACCT minidisk-mult-password'
```

Figure 41. Attempting to Transfer Files with FTP to an Accessed Minidisk

The problem results from CMS not permitting multiple virtual machines to have a write link to the same minidisk at the same time (and thus to cause data corruption). The VM FTP server runs in a different virtual machine, and thus triggers this problem if the NOVSTART userid is logged on, or if you have the desired disk linked read/write from another userid.,

To solve this problem, exit the FTP client and ensure that the NOVSTART userid is not logged on, and that you do not have the minidisk accessed or linked from your userid. The CMS QUERY USERID NOVSTART command will show you if the NOVSTART userid is logged on. The QUERY VIRTUAL DISK command will show you what minidisks you have linked at the time of execution.

If the NOVSTART id is logged on, log it off. If you have the disk linked, use the DETACH command with the address shown to detach it from your userid.

If you still have problems, report a problem as described in "How to Report Problems With the Starter System" on page 36

How to Report Problems With the Starter System

If the problem you are experiencing is not covered in the previous section, follow these steps to report a problem to Novell.

What to Collect Before You Report A Problem

You should collect the following information before you report a problem to Novell:

- A console log showing the error. You can obtain this by typing `#CP SPOOL CONSOLE TO * START` and repeating the failing step.

- A short description of the problem. Explain what you are doing, and what you expected the outcome to be.

- How you want to be contacted.

Where to Report A Problem

Report your problem to the Novell Customer Center as described in the Novell Customer Center Users Guide. You can obtain a copy of the guide online. Consult the references provided in Appendix D, "SUSE Linux Enterprise Server References" on page 42 for the location of this document and how to retrieve a copy.

Appendices

Appendix A. Contents of Starter System Distribution Archives

Table 10. Starter System Distribution Archive Contents	
Archive	**Contents**
VMAEXEC EXEC	A self-extracting copy of VMARC MODULE
CMSDEXEC EXEC	A self-extracting copy of CMSDDR VMARC
NOVSTART SAMPDIR	The sample CP directory entry for the starter system in EBCDIC.
NOVSTART SAMPASC	The sample CP directory entry for the starter system in ASCII.
NOV191 VMARC	The sample PROFILE EXEC, PROFILE XEDIT and NETWORK PARMS for the starter system.
NOV150 VMARC	The bootable Linux image providing the installation functions and basic software for the FTP, HTTP, SMB and NFS servers.
NOV151 VMARC	The SLES 10 SP1 RPM repository
NOV19F VMARC	IPLable kernel data, the sample virtual server CP directory entry, helpful CMS tools for building Linux virtual servers.

Appendix B. Copyright and License Information

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Availability of Source Code

For size and simplification of installation, the source code to the utilities and programs included in the starter system has not been included in the disk images. Complete source code for all system components is available from `http://www.novell.com/linux/source/`.

CMS Utility Licenses

VMARC is copyright 1982 by John Fisher and is used here by permission of the author.

CMSDDR is used here by permission of International Business Machines (IBM).

Appendix C. IBM References

This section describes additional IBM and Novell books and online documentation that can help you plan, install, customize and administer your system. If you do not find the references you need please submit a written comment to support@sinenomine.net.

z/VM Books and Information

Most IBM manuals and z/VM books are available online at http://www.vm.ibm.com/library in HTML and PDF formats.

- Planning

    – z/VM 5.3 General Information (GC24-6095)

    – z/VM 5.3 I/O Configuration   (SC24-6100)

    – z/VM 5.3 Getting Started with Linux on System z9 and zSeries (SC24-6096)

    – z/VM 5.3 CP Planning and Administration (SC24-6083)

    – z/VM 5.3 Running Guest Operating Systems (SC24-6115)

- Installation

    Refer to the z/VM program directory for a short installation overview.

- Customization

    – z/VM 5.1 CMS Primer (SC24-6137)

    – z/VM 5.1 XEDIT Commands and Macros Reference (SC24-6131)

    – z/VM 5.3 CP Commands and Utilities (SC24-6081)

    – z/VM 5.3 CMS Commands and Utilities Reference (SC24-6073)

    – z/VM 5.3 Directory Maintenance Facility Tailoring and Administration Guide (SC24-6135)

    – z/VM 5.3 TCP/IP Planning and Customization (SC24-6125)

    – z/VM 5.3 REXX/VM User's Guide (SC24-6114)

- Administration

    – z/VM 5.3 Performance (SC24-6109)

    – z/VM 5.3 Diagnosis Guide (GC24-6092)

    – z/VM 5.3 CP Messages and Codes (GC24-6119)

    – z/VM 5.3 CMS Messages and Codes (GC24-6118)

    – z/VM 5.3 VM Dump Tool (GC24-6129)

Online Articles and References

- Mailing Lists

    – IBMVM@LISTSERV.UARK.EDU

        A helpful place to ask questions about z/VM and it's capabilities.

- z/VM WWW Sites

– www.vm.ibm.com

This is the main IBM WWW site for z/VM information. The site contains information about the z/VM hypervisor, documentation, white papers and other helpful configuration information and tips.

Appendix D. SUSE Linux Enterprise Server References

Most SUSE Linux manuals and information is available online at http://www.novell.com/documentation/sles10/. Individual manuals and documents you may find helpful are listed below.

SUSE Linux Enterprise Server for System z Books and Information

- Planning

  - SUSE Linux Enterprise Server for System z Start-Up Guide

    www.novell.com/documentation/sles10/
    /startup/data/part_zseries.html

    Cookbook document describing the overall installation process for System z machines. Useful when performing installations from the starter system installation server.

  - Release Notes for SUSE Linux Enterprise Server for System z

    www.novell.com/linux/releasenotes/s390x/SUSE-SLES/10-SP1/
    RELEASE-NOTES.en.html (all one line)

    Release notes for the SUSE Linux Enterprise Server for System z environment.

  - Architecture-Specific Information (System z)

    www.novell.com/documentation/sles10/pdfdoc/
    sles_zseries/sles_zseries.pdf

    Architecture specific notes on System z installation and planning.

- Installation

  - SUSE Linux Enterprise Server for System z Installation and Administration Guide

    www.novell.com/documentation/sles10/sles_admin/sles_admin.pdf

    Comprehensive installation documentation, including planning and deployment strategies, YaST, remote installation, automated installation, and updating techniques.

- Customization

  - SUSE Linux Enterprise Server for System z Installation and Administration Guide

    www.novell.com/documentation/sles10/sles_admin/sles_admin.pdf

    Comprehensive installation documentation, including planning and deployment strategies, YaST, remote installation, automated installation, and updating techniques.

- Administration

  - SUSE Linux Enterprise Server for System z Installation and Administration Guide

www.novell.com/documentation/sles10/sles_admin/sles_admin.pdf

Comprehensive installation documentation, including planning and deployment strategies, YaST, remote installation, automated installation, and updating techniques.

– SUSE Linux Enterprise Server for System z Storage Administration Guide

www.novell.com/documentation/sles10/pdfdoc/
stor_evms/stor_evms.pdf

Guide to using different disk storage management philosophies on SUSE Linux Enterprise Server for System z and the various tools used to implement them.

– Novell Customer Center User Guide

www.novell.com/documentation/ncc/index.html

A guide to using and contacting the Novell Customer Center. This document describes the procedures and contact information for getting assistance with this and other Novell products.

Online Articles and References

- Mailing Lists

  – linux-390@vm.marist.edu

  The most popular electronic mailing list for discussing Linux on System z machines. To subscribe to the mailing list, send an email to listserv@vm.marist.edu with the words:

  SUBSCRIBE linux-390 <your name>

  in the BODY of the email message (where your text normally goes). You will begin to receive messages from the mailing list almost immediately.

  Note that this list is relatively high volume and may be quite technical in character.

- SUSE Linux Enterprise Server for System z Web Sites

  – http://www.novell.com/products/server

  Novell resources and information about SLES.

  – www.novell.com/documentation/sles10

  The SUSE Linux Enterprise Server for System z documentation.

  – www.novell.com/linux/source

  Complete source code to SUSE Linux Enterprise Server for System z packages and applications.